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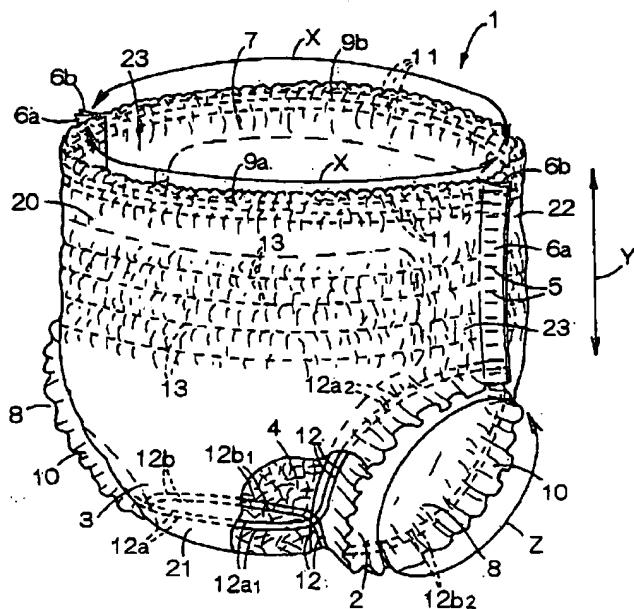
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(54) Disposable pull-on wearing article

(57) A disposable pull-on wearing article 1 folded along a folding zone 14 extending across a crotch region 21 in a transverse direction so that the inner surface of the article 1 comes in contact with itself. The folding zone 14 is formed at a position displaced toward a front

waist region 20 so that a front peripheral edge portion 9a of a waist-opening 7 defined by the front waist region 20 lies at a longitudinally lower position than that of a rear peripheral edge portion 9b of the waist-opening 7 defined by a rear waist region 22.

FIG. I



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**Description**

**[0001]** This invention relates to a disposable pull-on wearing article such as a disposable pants-type diaper, training pants or disposable pants for incontinent patients.

**[0002]** Japanese Utility Model Application Publication No. 3021190B discloses a structure of foldable disposable pants. The pants described in the Publication basically comprise a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between these two sheets so as to define a waist-opening and a pair of leg-openings.

**[0003]** In such pants of well known art, one of transversely opposite lateral regions extending between front and rear waist regions is tucked inwardly of the pants so as to be disposed between these waist regions and the other is folded back onto the outer surface of one of the front and rear waist regions. As each of transversely opposite lateral regions is folded up to a direction central to the waist regions of the pants, a folded up shape of the pants may be formed into a substantially rectangular shape.

**[0004]** To wear the pants in a folded up state, the waist-opening peripheral edge portion defined by the front waist region and peripheral edge portion of the other half of the waist-opening defined by the rear waist region must be picked up with fingers and pulled each other to widen the waist-opening of the pants. These two peripheral edge portions are overlapped and joined to each other, so it is not easy to insert the thumbs of both hands into the space between the peripheral edge portions and correspondingly wearing of the pants takes much time.

**[0005]** It is an object of this invention to provide a disposable pull-on wearing article improved to be foldable so that peripheral edge portions of the waist-opening defined by the front and rear waist regions can be picked up without inserting the thumbs of both hands into the space between the peripheral edge portions of the waist-opening.

**[0006]** According to this invention, there is a disposable pull-on wearing article comprising front and rear waist regions opposed to each other and a crotch region positioned between these waist regions so as to define a waist-opening and a pair of leg-openings.

**[0007]** The disposable pull-on diaper further comprises that the article is folded up along a folding zone extending across the crotch region in a transverse direction so that an inner surface of the article comes in contact with itself wherein the folding zone is formed at a position displaced toward one of the front waist region and the rear waist region so that one of front and rear peripheral edge portions of the waist-opening defined by the front and rear waist regions lies at a position lower than that of the other of the front and rear peripheral edge portions.

**[0008]** According to one preferred embodiment of this

invention, each of transversely opposite regions extending in a waist-surrounding direction between the front and rear waist regions is tucked inwardly of the article so as to be disposed between the front and rear waist regions.

Fig. 1 is a perspective view showing a partially cutaway disposable diaper;

Fig. 2 is a perspective view showing the same diaper in folded state as viewed from the side of a front waist region;

Fig. 3 is a sectional view taken along a line A - A in Fig. 2;

Fig. 4 is a perspective view showing the diaper of Fig. 2 as having been further folded up;

Fig. 5 is a sectional view taken along a line B - B in Fig. 4; and

Fig. 6 is a perspective view showing a package containing therein a plurality of the diapers each shown in Fig. 4.

**[0009]** Details of a disposable pull-on wearing article according to this invention will be more fully understood from the description given hereunder with reference to the accompanying drawings.

**[0010]** Fig. 1 is a perspective view showing a partially cutaway disposable pull-on diaper 1, Fig. 2 is a perspective view showing the diaper 1 in its folded state as viewed from the side of a front waist region 20 and Fig.

3 is a sectional view taken along a line A - A in Fig. 2. In Fig. 1, a waist-surrounding direction is indicated by an arrow X, a longitudinal direction is indicated by an arrow Y and a thigh-surrounding direction is indicated by an arrow z. It should be understood that the surfaces of top- and backsheets 2, 3 facing a core 4 will be hereinafter referred to as inner surfaces of the sheets 2, 3 and the surfaces of the top- and backsheets 2, 3 not facing the core 4 will be hereinafter referred to as outer surfaces of the sheets 2, 3.

**[0011]** The diaper 1 basically includes the liquid-permeable topsheet 2, the liquid-impermeable backsheet 3 and the liquid-absorbent core 4 disposed between these sheets 2, 3 and entirely covered with and bonded to tissue paper (not shown). The core 4 is bonded to the inner surfaces of the topsheet 2 and the backsheet 3 with the tissue paper therebetween.

**[0012]** The diaper 1 is composed of front and rear waist regions 20, 22 opposed to each other and a crotch region 21 positioned between these front and rear waist regions 20, 22. The front and rear waist regions 20, 22 respectively have transversely opposite side edge portions 6a, 6b extending outwardly from the waist regions 20, 22 respectively. These side edge portions 6a, 6b are overlaid like interlocked hands and bonded intermittently at a plurality of spots 5 arranged in the longitudinal direction in the vicinity of the side edge portions 6a, 6b.

**[0013]** The diaper 1 further includes transversely opposite lateral regions 23 extending in the waist-sur-

rounding direction between the front and rear waist regions 20, 22 defined by connecting the front and rear waist regions 20, 22 to each other along the respective side edge portions 6a, 6b. Thereupon, a waist-opening 7 and a pair of leg-openings 8 are also defined.

[0014] Along front and rear peripheral edge portions 9a, 9b of the waist-opening 7 defined by the front and rear waist regions 20, 22 respectively, elastic members 11 each comprising a plurality of elastic elements and stretchable in the waist-surrounding direction are disposed between the top- and backsheets 2, 3 and bonded under tension to the inner surfaces of these sheets 2, 3.

[0015] Along peripheral edge portions 10 of the leg-openings 8, elastic members 12 each comprising a plurality of elastic elements and stretchable in the thigh-surrounding direction are disposed between the top- and backsheets 2, 3 and bonded under tension to the inner surfaces of these sheets 2, 3.

[0016] Elastic members 12 associated with the leg-openings comprise a first elastic member 12a and a second elastic member 12b associated with the respective leg-openings. These first and second elastic members 12a, 12b have central sections 12a<sub>1</sub>, 12b<sub>1</sub> extending across the crotch region 21 in the transverse direction and end sections 12a<sub>2</sub>, 12b<sub>2</sub> extending along the peripheral edge portions 10 of the associated leg-openings 8. The end sections 12a<sub>2</sub> of the first elastic member 12a extend along substantially front half of the peripheral edge portions 10 of the associated leg-openings 8 and the second elastic member 12b extend along substantially rear half of the peripheral edge portions 10 of the associated leg-openings 8.

[0017] Between the elastic members 11 associated with the waist-opening and the elastic members 12 associated with the leg-openings, a plurality of auxiliary elastic members 13 stretchable in the waist-surrounding direction are disposed between the top- and backsheets 2, 3 and bonded under tension to the inner surfaces of the sheets 2, 3. Fig. 1 shows a state in which a plurality of gathers are formed along the front and rear peripheral edge portions 9a, 9b of the waist-opening 7, the peripheral edge portions 10 of the respective leg-openings 8 and the front and rear waist regions 20, 22 as the elastic members 11, 12, 13 contract themselves, respectively.

[0018] As will be apparent from Fig. 2, the diaper 1 is folded along a folding zone 14 extending across the crotch region 21 in the transverse direction so that the outer surface of the topsheet 2 (i.e., the inner surface of the diaper 1) comes in contact with itself. The folding zone 14 is formed at a position appropriately displaced toward the front waist region 20. With the diaper 1 folded along such folding zone 14, the front peripheral edge portion 9a of the waist-opening 7 defined by the front waist region 20 lies at a position longitudinally lower than that of the rear peripheral edge portion 9b of the waist-opening 7 defined by the rear waist region 22.

[0019] With the diaper 1 having the front and rear pe-

ripheral edge portions 9a, 9b of the waist-opening 7 lying at different positions, the rear peripheral edge portion 9b can be easily held by the fingers without trouble in inserting the thumbs of both hands into the space between the front and rear peripheral edge portions 9a, 9b.

[0020] The waist-opening 7 is slightly widened and the front peripheral edge portion 9a is spaced from the rear peripheral edge portion 9b as the rear peripheral edge portion 9b is held by the fingers. Consequently, the front peripheral edge portion 9a can be easily held by the fingers. Now both the front peripheral edge portion 9a and the rear peripheral edge portion 9b may be separately held by the fingers of both hands and pulled in opposite directions to space one from another to further widen the waist-opening 7 of the diaper 1 in a folded up state.

[0021] Fig. 4 is a perspective view showing the diaper 1 of Fig. 2 as having been further folded up, Fig. 5 is a sectional view taken along a line B - B in Fig. 4 and Fig. 6 is a perspective view showing a package 15 containing therein a plurality of the diapers 1 each shown in Fig. 4. The transversely opposite lateral regions 23 are tucked inwardly of the diaper 1 so that these lateral regions 23 are disposed between the front and rear waist regions 20, 22. The rear peripheral edge portion 9b of the waist-opening 7 defined by the rear waist region 22 has its transversely middle section 9b<sub>1</sub> extending upward beyond the front peripheral edge portion 9a of the waist-opening 7 defined by the front waist region 20.

[0022] Tucking of the lateral regions 23 inwardly of the diaper 1 enables the diaper 1 to be made more compact in size than the diaper 1 in the state shown in Fig. 2. The middle section 9b<sub>1</sub> of the rear peripheral edge portion 9b serves as a grip which may be held by the fingers to hold the rear peripheral edge portion 9b without the troublesome operation of inserting the thumbs of both hands into the space between the front and rear peripheral edge portions 9a, 9b. For this diaper 1, the front peripheral edge portion 9a may be held by the fingers after the middle section 9b<sub>1</sub> of the rear peripheral edge portion 9b has been held.

[0023] As seen in Fig. 6, a plurality of the diaper 1 may be packed in the package 15 with one diaper closely placed one another. The middle sections 9b<sub>1</sub> of the respective rear peripheral edge portions 9b extend upward beyond the front peripheral edge portions 9a so that the individual diaper 1 may be taken out from the package 15 merely by holding the middle section 9b<sub>1</sub> of the rear peripheral edge portion 9b. In this way, operation of taking the diaper 1 out from the package 15 is facilitated.

[0024] While the folding zone 14 illustrated in the accompanied fingers extending across the crotch region 21 in the transverse direction is provided at the position displaced toward the front waist region 20, it is also possible to provide the folding zone 14 at the position displaced toward the rear waist region 22. With the diaper 1 having the folding zone 14 formed at the position displaced toward the rear waist region 22, the rear periph-

eral edge portion 9b of the waist-opening 7 defined by the rear waist region 22 lies at a longitudinally lower position than that of the front peripheral edge portion 9a of the waist-opening 7 defined by the front waist region 20.

[0024] From the package 15 within which a plurality of the diaper 1 according to the embodiment illustrated in Fig. 2 are closely packed one upon another, the individual diaper 1 can be easily pulled out with the rear peripheral edge portion 9b of the waist-opening 7 defined by the rear waist region 22 held by fingers since this rear peripheral edge portion 9b extends upward beyond the front peripheral edge portion 9a of the waist-opening 7 defined by the front waist region 20.

[0025] The topsheet 2 may be formed by a hydrophilic fibrous nonwoven fabric or a porous plastic film. The backsheet 3 may be formed by a hydrophobic fibrous nonwoven fabric, a liquid-impervious plastic film or a laminated composite sheet of hydrophobic nonwoven fabric and plastic film. The backsheet 3 may be also formed by a composite nonwoven fabric consisted of a melt blown fibrous nonwoven fabric having a high water-resistant property sandwiched by two layers of spun bond nonwoven fabric having high strength and flexibility.

[0026] The nonwoven fabric may be selected from a group including spun lace-, needle punch-, melt blown-, thermal bond-, spun bond-, chemical bond- and air through-nonwoven fabric. Component fiber of the nonwoven fabric may be selected from a group including polyolefine-, polyester- and polyamide-based fibers and polyethylene/polypropylene or polyethylene/polyester core-sheath type conjugated fiber and side-by-side-type conjugated fiber.

[0027] The core 4 is a mixture of fluff pulp, high absorption polymer particles and thermoplastic synthetic resin fibers compressed to a desired thickness. The polymer particles may be selected from a group including starch-, cellulose-based polymer and synthetic polymer.

**[0028]** To bond the top- and backsheets 2, 3 to each other, to bond the core 4 to the top- and backsheets 2, 3 and to attach the elastic members 11, 12, 13 to the diaper 1, suitable adhesives such as hot melt adhesives or welding means like heat-sealing or ultrasonic sealing may be used.

[0029] The pants-type disposable wearing article according to this invention includes the folding zone extending across the crotch region in the transverse direction. This folding zone is formed at the position displaced toward any one of the front and rear waist regions so that one of the front and rear peripheral edge portions of the waist-opening defined by these two waist regions may lie at a longitudinally lower position than that of the other as the diaper is folded up. This unique arrangement advantageously eliminates the troublesome operation of inserting the thumbs of both hands into the space between the front and rear peripheral edge portions of the waist-opening defined by the front and rear waist regions, respectively. Specifically, the above-men-

tioned unique arrangement enables the waist-opening to be widened merely by holding one of the front and rear peripheral edge portions with the fingers and then holding the other in the same manner.

5 [0030] With the article having its lateral regions tucked inwardly of the article so as to be disposed between the front and rear waist regions and one of the front and rear peripheral edge portions of the waist-opening defined by the front and rear waist regions lying at a longitudinally lower position than that of the other, the transversely middle section of the one peripheral edge portion extends upward beyond the other peripheral edge portion. Such feature enables the waist-opening to be widen merely by holding the transversely middle section with the finger and then by holding the other peripheral edge portion in the same manner.

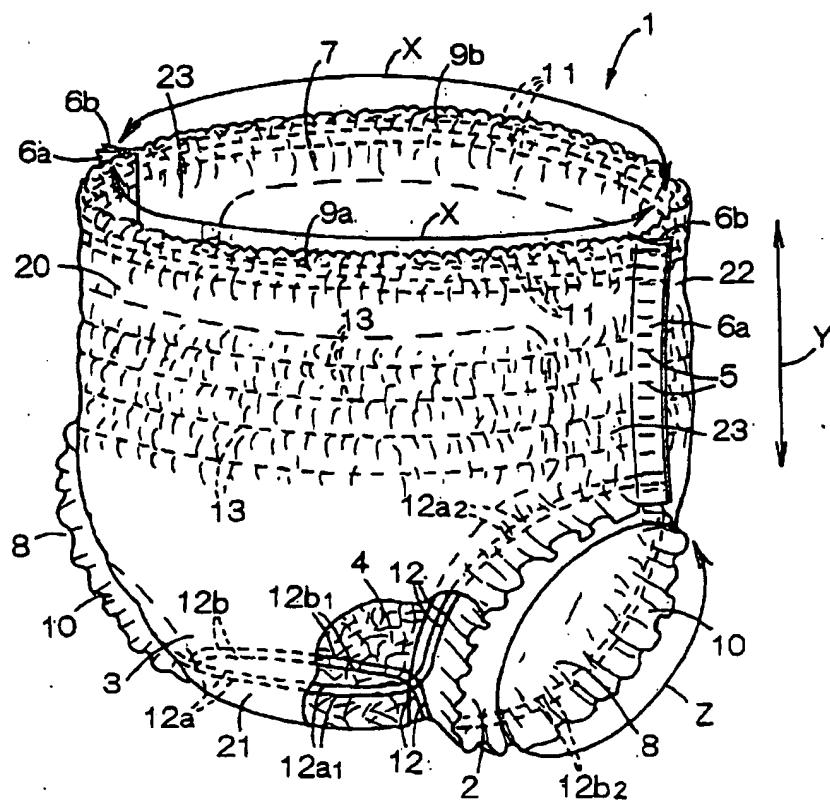
[0031] From the package containing therein a plurality of these articles, the individual article can be easily taken out therefrom merely by pulling the individual article out from the package with the one peripheral edge portion or the transversely middle section thereof held with the fingers.

25 Claims

1. A pants-type disposable wearing article comprising front and rear waist regions opposed to each other and a crotch region positioned between these waist regions so as to define a waist-opening and a pair of leg-openings wherein,

said article is folded along a folding zone extending across said crotch region in a transverse direction so that an inner surface of said article comes in contact with itself wherein said folding zone is formed at a position displaced toward one of said front waist region and said rear waist region so that one of front and rear peripheral edge portions of said waist-opening defined by said front and rear waist regions lies at a longitudinally lower position than that of the other of said front and rear peripheral edge portions.
  2. The article according to Claim 1, wherein transversely opposite lateral regions extending in a waist-surrounding direction between said front and rear waist regions are tucked inwardly of the article so as to be disposed between said front and rear waist regions.

FIG. I



## FIG.2

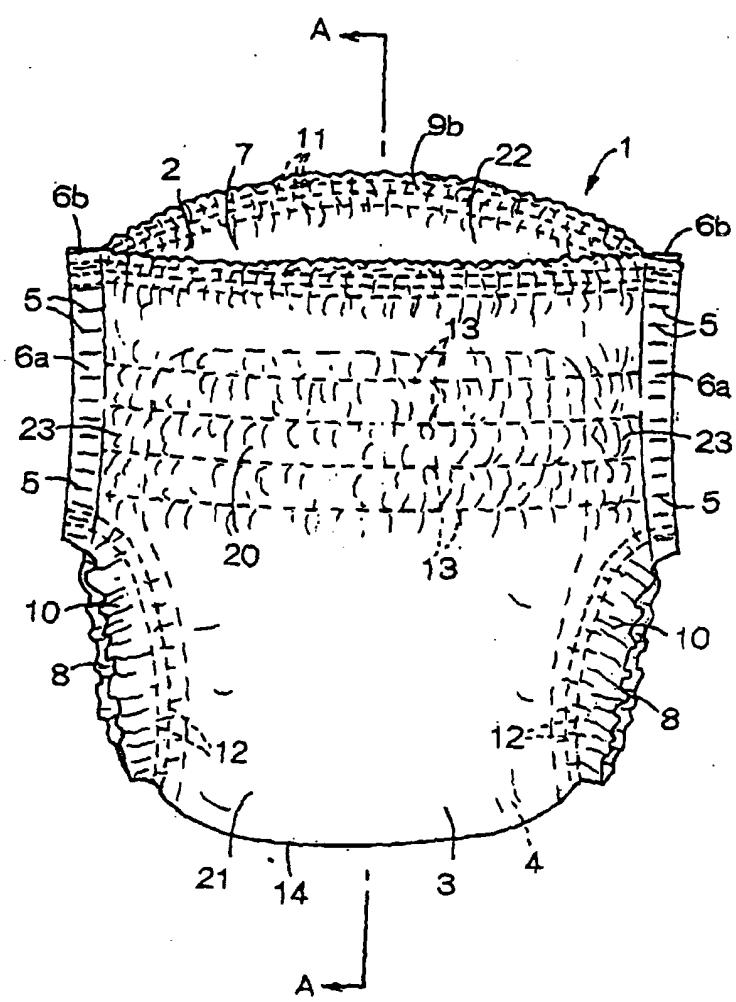


FIG. 3

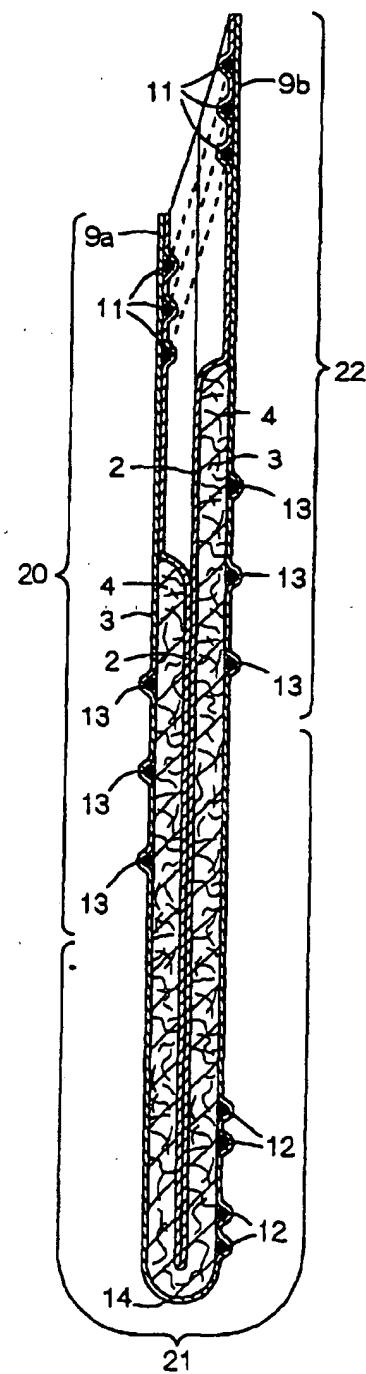


FIG.4

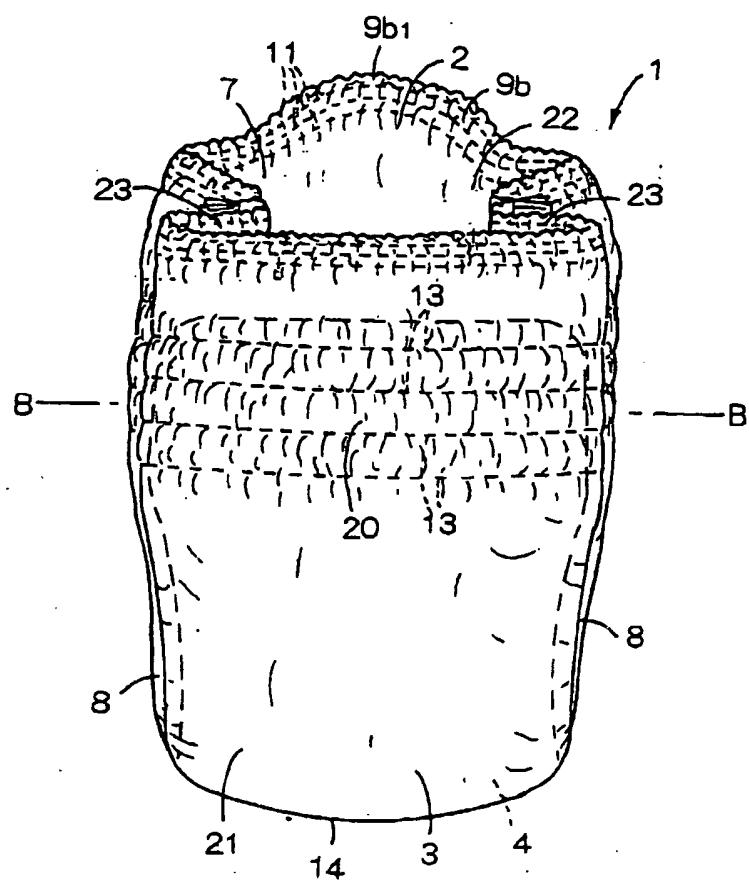
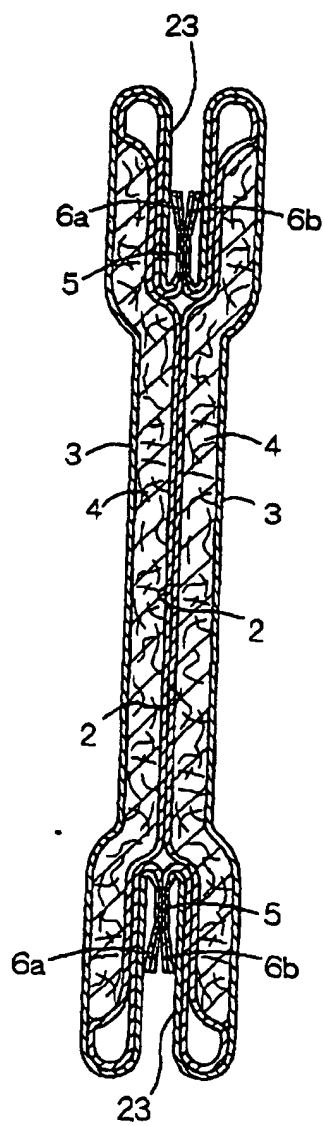
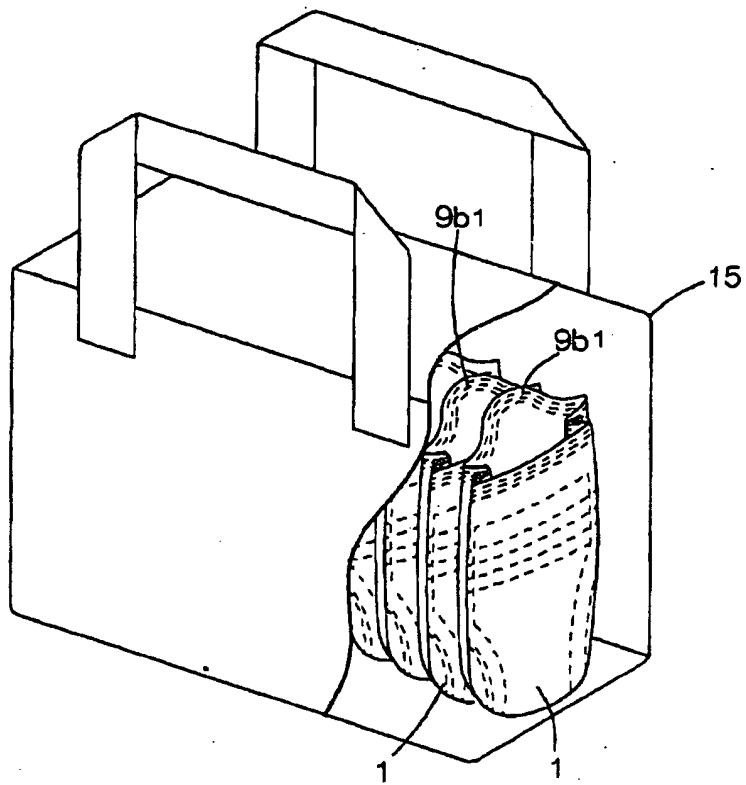


FIG.5



**FIG.6**





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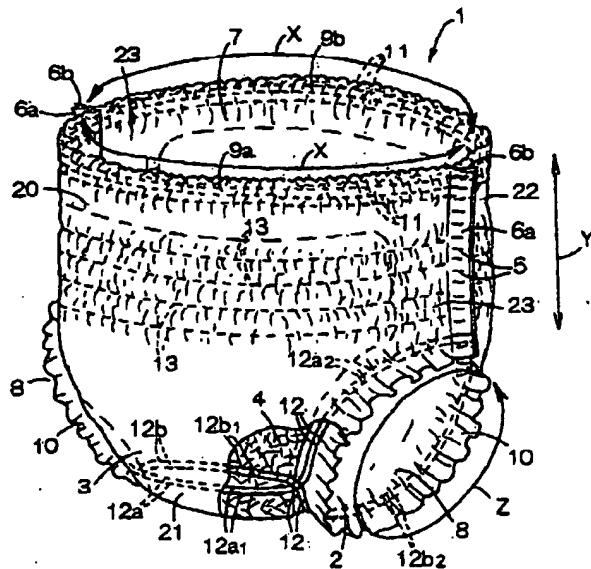
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## (54) Disposable pull-on wearing article

(57) A disposable pull-on wearing article 1 folded along a folding zone 14 extending across a crotch region 21 in a transverse direction so that the inner surface of the article 1 comes in contact with itself. The folding zone 14 is formed at a position displaced toward a front

waist region 20 so that a front peripheral edge portion 9a of a waist-opening 7 defined by the front waist region 20 lies at a longitudinally lower position than that of a rear peripheral edge portion 9b of the waist-opening 7 defined by a rear waist region 22.

FIG. I



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## EUROPEAN SEARCH REPORT

Application Number  
EP 01 12 5396

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
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			A61F A41B
<p>The present search report has been drawn up for all claims</p>			
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THE HAGUE	20 October 2003	Douskas, K	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the Invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
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